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ABSTRACT

The paper describes how certain questionnaire items concerning teacher-claimed behavior might define a teacher's effort to maintain order in the classroom. Subjects consisted of 255 secondary school teachers teaching in examination classes (Forms 3 and 5) at 15 schools in the District of Kuala Terengganu (Malaysia). The teachers responded to a questionnaire designed to assess Malaysian teachers and their teaching behavior. Each of the three questions administered contained five to nine items. The 21 items are designed to determine the means by which teachers maintain order in the classroom in relation to controlling students and focusing students' attention on learning and instruction. A Rasch computer program for ordered categories (MSTEPS) was used to obtain person measurements and item calibration and perform person and item fit analysis. Factor analysis was used to determine if an item described more than one dimension of teacher-claimed behavior. Results indicate that 18 items fit the proposed model. The typology included teachers who believe that a minimum level of order is sufficient and are low-effort teachers, teachers who believe that a higher level of order is somewhat necessary and are higher effort teachers, and teachers who believe that a maximum level of order is essential and are highest effort teachers. Although factor analysis of the 18 items implies that these items may be formed into two clusters, when these clusters are analyzed with MSTEPS and when the results are compared to those of the 18 items, it is evident that one variable is sufficient and that two are not necessary. (TJH)

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ONE IS SUFFICIENT OR TWO ARE NECESSARY

A substitute for "Clarifying Variables of Teaching Through
Factor Analysis of Rasch Standardized Residuals."

(A PAPER PRESENTED AT AERA ANNUAL MEETING

MARCH 29, 1989, SAN FRANCISCO, CALIFORNIA)

WAN MOHD RANI BIN ABDULLAH

MARCH, 1989

ACKNOWLEDGEMENT

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Conflicts in the classroom can arise when the purpose of a teacher differs from that of individual students or groups of students; the teacher wants one thing but the students want another. Furthermore, when the teacher is unable to create interesting learning conditions, many students will get weary and become disinclined to learn.

Results of many studies on classroom management suggest a consistent relationship between the quality of teacher classroom management and student achievement. Successful classroom managers have been able to create better learning environments. They have been able not only to provide students with more opportunity to learn but also to motivate them to spend much of the classroom time engaged in learning academic tasks and content (Brophy 1983, 1979, Good 1979).

A well-established classroom does not just happen. It results from consistent teacher efforts to create, maintain, and restore conditions that foster effective learning. To secure a well-managed classroom, Brophy and Putnam (1979) and Emmer, Evertson and Anderson (1980) suggest that a teacher must make careful preparation and planning well before the start of the school year.

No matter how well the teacher has prepared and planned his instruction, there may arise conditions in the classroom where the teacher has difficulty presenting the instruction and the students have not been able to concentrate on learning. These conditions are the classroom distractions which take the teacher and students away from the intended instructional tasks. Often, these distractions result from variations in the students' characteristics, classroom structures or environments, and the teaching style and management skills (Behnke et al. 1982).

Apart from good preparation and planning, the teacher has to develop effective teaching style and management skills to counter such unexpected events that may occur during the classroom instruction. Teachers must develop good management skills to enable them control students and keep them engaged in learning (Kounin 1970). They must avoid 'down-time' when the students have nothing to do or are not sure what they should do during the available classroom time. They must constantly secure an accurate picture of their teaching methods and styles of interaction with the students.

Anderson, Evertson and Emmer (1980) identify three clusters of teacher

behavior that relate to the time the students engage in learning tasks --

- (1) Teachers establish conditions in classrooms with routines and procedures to insure that instruction and teaching take top priority.
- (2) Teachers consider the task of controlling student behavior as an instructional challenge that requires similar approach and concern as instruction in other curriculum areas.
- (3) Teachers constantly monitor the class to determine that the students attend to the academic tasks and continuously engage in learning.

Teacher management skills should be able to resolve conflicts among individual students and groups of students. Research on group relationships has contributed useful information on interpersonal relationships and group dynamics. This information include how teachers can overcome social barriers associated with differences in sex, race, social class, and achievement.

Researchers turn to the study of grouping techniques because they believe that brighter and more emphatic students can induce participation and involvement of slower and less emphatic students in learning (Webb 1980). When the group success depends upon the contribution of its individual members, Slavin (1980) shows slower learners contribute as much to the team's total score as the high achievers. The approaches have improved not only the interpersonal relationships among students in the classroom but also the achievement of the slower learners.

Researches on classroom management show teachers are concerned not only with how to discipline students who misbehaved but also with how to organize students, counter distractions, and maintain a continuous academic focus of instruction for student attention and engagement in learning. The teacher management skills have been able to influence students behavior in learning. The students become more interested in learning and inclined to spend more time on learning the tasks. However, the problem which arises in many of those studies is how can we compare good managers from worst managers. Comparisons are made only after we know the relationships between the teacher management measures and other measures, such as, the student achievement or the time-on-task.

The Research Setting

Malaysia is comprised of two separate regions: West and East Malaysia. West Malaysia, formerly known as the Federation of Malaya or the Malay Peninsular, consists of the Federal Territory (Kuala Lumpur, the capital city of Malaysia)

and the following 11 states: Perlis, Kedah, Pulau Pinang, Perak, Selangor, Negri Sembilan, Melaka, Johor, Pahang, Terengganu and Kelantan. East Malaysia consists of the states of Sabah and Sarawak bordering Indonesia's Kalimantan.

Malaysia's population is composed of three major ethnic groups: Bumiputras (Malays and other indigenous groups), Chinese, and Indians. In 1980, the country's population composition was about 54 percent Bumiputras, 34 percent Chinese, 10 percent Indians, and 1 percent other.

From the composition of her population, the Malaysian society is not only culturally disintegrated but also occupationally and residentially separated. The Chinese are prospering in businesses, banking, manufacturing and industries and dwelling dominantly in urban areas. Majority of the Bumiputras are farmers and live in rural areas. Most of the Bumiputras who live in urban areas are government servants. Most of the Indians live and work in large rubber plantations, although a sizeable number of them have prospered as lawyers and businessmen and lived in urban areas.

Since her independence, Malaysia has been working toward nation building and integration of the various racial groups. Malaysia believes that there could be no unity among its population if one racial group is in prosperity while the others are in poverty. Thus, a two-pronged objectives [better known as New Economic Policy (NEP)] was designed and launched during the Second Malaysia Plan (1971-1975). These objectives were to eradicate poverty irrespective of race and to restructure society so as to reduce and eventually eliminate the identification of race with economic functions. The ultimate aim of the objectives is national unity.

Education in Malaysia. Public education is fully subsidized by the Federal Government. Since 1971, expenditure on education has increased tremendously from 1,308 million Malaysian ringgit in the Third Malaysia Plan (1971-1980) to 2,244 million Malaysian ringgit in the Fourth Malaysia Plan (1981-1985). To realize the attainment of the objectives of NEP, education is one of the main effective vehicles. Explicitly mentioned in the Fourth Malaysia Plan: "Policies and programmes for education and training will continue to be geared towards fostering national unity and increasing participation of all Malaysians in national development" (p. 343).

The Malaysian educational (school) system provides 13 years of free but not

compulsory education. Its structure has a 6-3-2-2 pattern. This structure represents the primary, lower secondary, upper secondary, and pre-university levels, respectively.

In Malaysia, one of its aims of education is to cultivate a disciplined society and national unity. To realize this aim, the schools are to play important roles in fostering common values, ideals, aspirations and loyalties among their students. Although it is important that the students should understand the concept of discipline and be internally induced, the schools are authorized to impose discipline upon them through the implementation of rules and regulations, and punishment. All teachers must regard educating students to follow rules and regulations, to practice good behavior, to respect the rights of others, and to exercise self-discipline as the integral parts of their responsibilities.

The role of a teacher is not only to instruct knowledge and skills but also to inculcate students with moral values and attitudes which would help and guide them to become loyal, responsible and useful citizens with respect for elders and for cultural, racial and religious differences, in 1978, the Cabinet Committee Report on the Implementation of Educational Policy Study put forward several recommendations. Among them was "... corporal punishment such as caning has to be maintained" (p. 121). The school principals and other teachers are authorized to cane. However, they have to comply with certain guidelines on how and when to use corporal punishment.

Purpose

The purpose of this paper is to investigate how certain questionnaire items on teacher-claimed behavior might define teacher's effort to maintain order in the classroom. Order in the classroom is necessary for effective learning and instruction. A teacher may not be able to instruct effectively and students may not be able to comprehend what is being taught by the teacher in a classroom full of conflicts and distractions.

Specifically, this paper is trying to determine whether the questionnaire items are describing one or more than one dimensions of the teacher-claimed behavior.

Sample

The sample is 255 secondary school teachers who teach in examination classes (Form 3 and 5) at fifteen schools in the District of Kuala Terengganu, Malaysia.

Kuala Terengganu is the capital of the state of Terengganu. It is situated on the north-east coast of Peninsular Malaysia. Recently (early 1970s), several off-shore oil deposits have been discovered along the coast of Terengganu. Revenues from oil and crude petroleum have influenced the state's economic development and the life of its people, especially, those in and around the District of Kuala Terengganu. As education has long been regarded as a tool for social mobility (e.g., Blau and Duncan 1967, and Boudon 1974), the state's economic development could be one of the factors that moved parents, particularly, toward revitalizing the importance of education in their children and pressing them to endeavor education and academic excellence in schools.

Given the district's economic and social growth, we envisage that teachers could be a factor for bringing about such realization and for meeting Malaysia's educational objectives in general. Stated in the Fourth Malaysia Plan (1981-85), one of the educational objectives is for "increasing participation of all Malaysians in national development." In view of this, the district may provide an ideal background for studying and understanding teachers in developing areas, especially, their effort in maintaining order in the classroom.

Data

The data for this paper are based on the responses of 255 teachers to three questions (21 items) from a questionnaire used in a study of Malaysian teachers and their teaching behavior. The aim of the study was to reveal strengths and weaknesses of the country's teacher education program and inform those involved in the education and supervision of teachers on how they can improve teacher education and training.

Each of the three questions consists of 5 to 9 items. They are shown in Table 1. The first question (5 items) tries to find out what teachers would do to students who look sleepy during the classroom instruction. The second question (9 items) tries to find out what teachers would do to students who talk among themselves while the teacher is teaching. The third question (7 items)

tries to find out what reasons do teachers consider when they are deciding to rearrange the classroom seating. The 21 items seek to show how the teacher maintains order in the classroom in relation to controlling the students and keeping focus of their attention on learning and instruction.

Several inferences can be made about a teaching-learning situation in which some students are looking sleepy or talking among themselves while the teacher is giving instruction.

Some teachers, who are able to secure an accurate picture of their teaching methods and styles of interaction with their students, may accept the fact that they are not quite successful in inducing students to learn. Thus, they may vary their teaching methods and styles of interaction when some of the students are looking sleepy or talking among themselves.

However, some other teachers may find it hard to admit that the conflicts within and among the students could be the result of their ways of instruction. Thus, instead of varying their teaching methods and styles of interaction, they may blame the students for not focusing their attention on learning and instruction.

In Table 1, there are a few punitive items. They are included in the questionnaire to find out how far a teacher would claim they do to maintain order in the classroom. We assume very few teachers would claim such punitive behavior. The teacher would only claim severe actions, like Q17(7) and Q17(6), when the students are extremely undisciplined. When the teacher uses corporal punishment on a student [i.e., Q17(6): Cane/punish students who talked among themselves during lesson], he has to justify his action to the authority (the school principal) and sometimes he has to show cause for taking such action to the student's parents.

Grouping techniques may induce students to participate in the learning. They may represent teachers' methods of teaching and styles of interaction with students. Thus Question 18 which is trying to find out reasons for teachers rearranging seating may describe teachers' effort to prevent conflicts in the classroom so that students can focus their attention on learning and instruction.

Definition of the Variable

To measure an attribute of persons, we must develop an instrument (i.e., a

test or questionnaire). This instrument consists of several items selected from a universe of items that are supposed to represent the attribute we are measuring. These items must work well together to define the variable we intend to construct.

TABLE 1: MAINTAINING ORDER IN THE CLASSROOM ITEMS

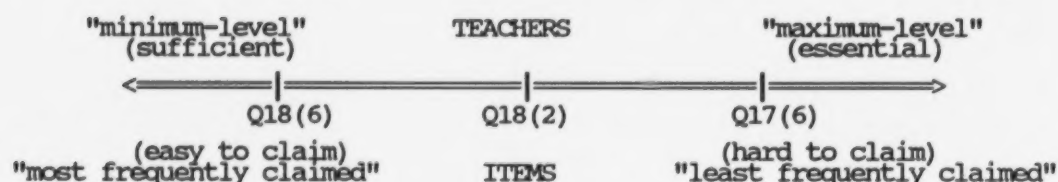
Responses: 4 - always
3 - frequently
2 - sometimes
1 - seldom
0 - never

Question No.	ITEMS
Q15(1)*	: Ask sleepy students to be awake during lesson.
Q15(2)	: Ask questions about the lesson to sleepy students.
Q15(3)	: Ask sleepy students to wash their faces.
Q15(4)	: Change teaching method when some students looked sleepy during the lesson.
Q15(5)	: Ask sleepy students to slap their faces.
Q17(1)	: Stop the lesson until students stop talking among themselves.
Q17(2)*	: Warn students to listen to you and keep quiet during lesson.
Q17(3)	: When some students talked among themselves during lesson, you ask anyone of them to repeat what you have just said.
Q17(4)	: Ask students who talked among themselves to stand on chairs.
Q17(5)	: Ask students who talked among themselves to do some physical exercises.
Q17(6)	: Ask students who talked among themselves to go out of the class.
Q17(7)	: Can/punish students who talked among themselves during lesson.
Q17(8)	: Change teaching method when some students talked among themselves during lesson.
Q17(9)	: Ask anyone students who talked among themselves to speak in front of the class.
Q18(1)	: Rearrange seating compatible to the objective of the lesson.
Q18(2)	: Rearrange seating to have equal ability students sit together.
Q18(3)*	: Rearrange seating to have low-score students sit together.
Q18(4)	: Rearrange seating to keep students pay attention to the lesson.
Q18(5)	: Rearrange seating compatible to the teaching resources.
Q18(6)	: Rearrange seating to have class control.
Q18(7)	: Rearrange seating compatible to the teaching method employed.

* These items have high infit values ($> |3.0|$).
They are dropped from the final MSTEPs analysis.

To measure a teacher's effort in maintaining order in the classroom, we must conceptualize its variable. We must be able to position both the items and persons along it according to their difficulty and ability parameters. Figure 1 indicates our conceptual definition of the effort variable.

FIGURE 1: A CONCEPTUAL DEFINITION OF TEACHER'S EFFORT TO MAINTAIN ORDER IN THE CLASSROOM



Our success in defining the variable of increasing intensity depends upon how well the items fit onto and are separated along the line. From a set of items (see Table 1), let us consider only three items — "Q18(2): Rearrange seating to have equal ability students sit together," "Q18(6): Rearrange seating to have class control," and "Q17(6): Ask students who talked among themselves to go out of the class." Most teachers would claim "most frequently" to the second item [Q18(6)] and "least frequently" to the third item [Q17(6)]. There could be several reasons for their claims. The second item is practically easier to claim, the first is harder (it requires deep thinking and more effort), and the third is much harder still. Although, it seems easier for a teacher to send students out of the classroom, the reason for this action must be justified to the school principal. In Malaysia, it is an obligation of the teachers to provide all students an equal opportunity to learn. This means that the students must not be ordered out of the classroom, unless they are extremely undisciplined.

Many teachers would think that if they could adequately maintain order in the classroom by arbitrarily rearranging the students' seating [Q18(6)], they would not need to think further about the ability of the students [Q18(2)]. If a teacher thinks that it is quite 'essential' to consider the ability of the students in rearranging the class seating — i.e., to maintain order in the classroom — then he would also claim the first item. In certain circumstances,

there might be students who are extremely resistant to learning and the teacher's instruction. Not only they themselves do not learn but they distract and obstruct the other students from the learning. They continue talking among themselves even after several preventive measures have been taken by the teacher.

Conceptually, it is logical to assume that item Q18(6) represents a low-level activity which most teachers claim "most frequently" and item Q17(6) represents a high-level activity which most teachers claim "least frequently." This polarity, however, is related to the teacher perception about maintaining order in the classroom. To achieve an effective teaching and learning, some teachers believe a "minimum-level" of order to be 'sufficient,' while others believe a "maximum-level" of order to be 'essential.' When teachers believe a minimum-level of order in the classroom is sufficient they will claim "most frequently" to items which indicate low-level activities and "least frequently" to items which indicate high-level activities. When teachers believe a maximum-level of order in the classroom is essential they will claim "most frequently" not only to items which indicate low-level activities but also to items which indicate high-level activities.

We hypothesize that the 18 items in Table 1 will work together to define the teacher's effort in maintaining order in the classroom variable. Items related to minimum-level of order in the classroom will be positioned toward one end and items related to maximum-level of order in the classroom will be positioned toward the other end of the variable.

Procedure and Results

To develop a teacher's effort in maintaining order in the classroom variable, we use MSTEPs (a Rasch computer program for ordered categories). From it we obtain person measurement and item calibration, and perform person and item fit analysis. When our data fit the model, we obtain objective measures (Rasch 1960). This characteristic of measures is the basis for any measurement systems to be regarded as useful. The analysis produces a common metric for specifying the relation between person measures and item calibrations.

To explore whether the questionnaire items might be describing more than one dimension of teacher-claimed behavior, we use factor analysis. Factor analysis can be useful for finding clusters of items which may represent multiple

dimensions.

Table 2 shows the item statistics from the MSTEPS analysis of the 18 items in measure order and a summary of the 18 calibrated item steps. The item calibrations range from -1.06 for Q18(6) to +1.33 for Q17(6). The item separation and reliability indices (14.0 and 0.99) show that the 18 items are well separated in difficulty.

TABLE 2: THE ITEM STATISTICS

255 PERSONS		18 ITEMS	PARTIAL CREDIT STEPS ANALYSIS					
		ITEM	STATISTICS	MEASURE ORDER				
NUM	NAME	SCORE	SAMPLE	WEIGHT	MEASURE	ERROR	MNSD	OUTFIT
[LEAST FREQUENTLY CLAIMED]								
Q17(6)	Go Out of Cl	162	254	3.77	1.33	.10	1.2	2.6
Q15(3)	Slap Faces	93	253	3.56	1.27	.11	1.0	2.2
Q17(7)	Came/Punish	120	254	3.07	1.12	.11	1.1	1.4
Q17(5)	Do Physical Ex	168	254	2.63	.97	.08	1.0	.2
Q17(4)	Stand on Chair	199	254	2.63	.97	.08	1.0	1.1
Q17(9)	Ask to Speak	414	254	1.30	.26	.06	1.0	.0
Q18(2)	S/W Ability	558	252	.88	-.13	.07	.9	-1.3
Q17(8)	Chg 1-Method-2	552	254	.82	-.20	.07	1.0	.2
Q18(4)	S/W Attention	584	253	.75	-.29	.08	.8	-2.2
Q18(5)	S/W Resource	564	252	.73	-.31	.07	.9	-1.0
Q18(1)	Chg 1-Method-1	600	253	.67	-.40	.07	1.0	-.1
Q18(1)	S/W Objective	607	253	.67	-.41	.07	.9	-1.0
Q17(3)	Ask to Repeat	632	254	.60	-.52	.06	1.0	-.3
Q15(3)	Wash Faces	626	255	.57	-.56	.07	1.1	2.1
Q18(7)	S/W Method	638	251	.54	-.62	.07	.9	-1.4
Q17(1)	Stop Lesson	502	255	.52	-.65	.08	1.1	1.5
Q15(2)	Ask Question	697	255	.46	-.78	.07	1.1	.9
Q18(6)	S/W Control	755	253	.35	-1.06	.08	.9	-.8
[MOST FREQUENTLY CLAIMED]								
"WEIGHTS" ARE MULTIPLICATIVE ON A RATIO SCALE. "MEASURES" ARE ADDITIVE ON AN INTERVAL SCALE. THE STANDARD ERROR OF A WEIGHT IS THE VALUE OF THE "WEIGHT" TIMES THE VALUE OF THE "ERROR"								
SUMMARY OF 18 CALIBRATED ITEM STEPS								
	SCORE	COUNT	MEASURE	ERROR	MNSD	OUTFIT	INFIT	
MEAN	470.6	253.7	.12	.08	1.0	.21	.00	
S.D.	218.5	1.2	1.11	.01	.1	1.40	1.10	
RMS	.08	ADJ.S.D.	1.10	ITEM SEP	14.00	ITEM SEP REL.	.99	

The ordering of the item calibrations indicates that the items are reasonably ordered in increasing intensity from Q18(6) representing a minimum effort behavior which most teachers claim "most frequently," to Q17(6) representing a maximum effort behavior which most teachers claim "least frequently."

The position of these items complies with the intended idea of this effort variable. Teachers who believe a minimum level of order in the classroom to be

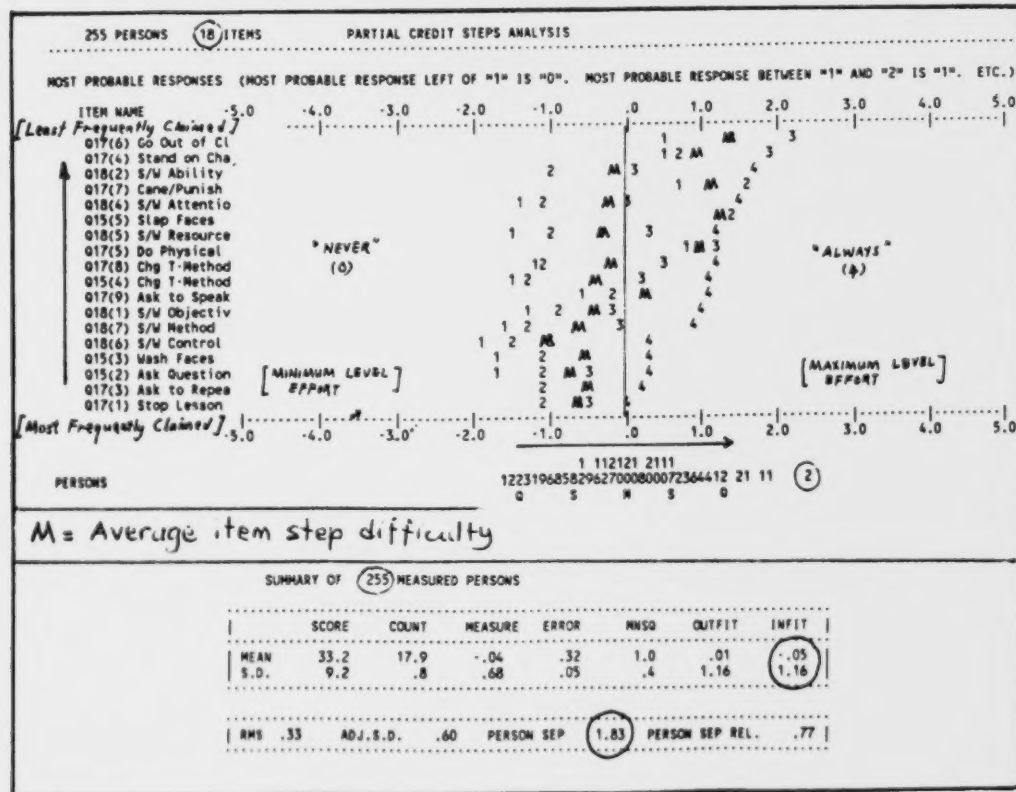
sufficient for an effective teaching and learning will claim "most frequently" to item Q18(6) and "least frequently" to item Q17(6). Teachers who believe a maximum level of order in the classroom to be essential will claim "most frequently" not only to item Q18(6) but also to item Q17(6). Some teachers adopt only preventive measures while others adopt severe measures to get students to focus attention on learning and instruction.

Table 3 shows the partial credit steps analysis for the 255 teachers' responses to the 18 items and the summary statistics of the teachers' effort measures. MSTEPS estimates the step difficulty of each item separately. Thus the patterns of the step difficulty estimates are different for different items. These patterns suggest that the response categories are not equally useful. For example, all teachers are expected to "stop the lesson until the students stop talking among themselves." Hence, the response category 'never' for item Q17(1) turned out to be irrelevant.

M is the average item step difficulty of an item i , for $i = 1, 2, \dots, 18$, at which point is the corresponding item i calibration. The average item step difficulty of item Q18(6) is between step 2 and step 4. If a teacher's measure equals this item's calibration, i.e., -0.77 , then his most probable response to Q18(6) is 'sometimes/frequently.' The average item step difficulty of item Q15(5) is below step 2. If a teacher's measure is -0.38 , then his most probable response to this item is 'never/seldom.'

At the bottom of Table 3(a) is the distribution of the 255 teachers' effort measures. It ranges from -1.63 for teacher 007045 to $+2.40$ for teachers 010185 and 111175. The mean teacher's effort measure is -0.04 and the standard deviation is 0.68 . Most teachers are located within 2 standard deviations of the mean effort measures, i.e., within -1.40 and $+1.32$. Six teachers have measures higher than $+1.32$, and three teachers have measures lower than -1.40 . Teacher 007045, whose measure is -1.63 , is lowest on the effort scale. His responses to most of the 18 items are 'sometimes' or less often. He claims only 'sometimes' to items Q17(1) and Q17(3) which more than half of the teachers claim 'frequently' and 'always.' He shows little concern for students who look sleepy or talk while he is teaching. He claims a minimum level of effort in maintaining order in the classroom.

TABLE 3: PARTIAL CREDIT STEPS AND PERSON STATISTICS



Teachers 010185 and 111175, whose measures are +2.40, are highest on the effort scale. Their responses to most of the 18 items are 'frequently' and 'always.' They show great concern for the students who look sleepy and talk while they are teaching. They claim a maximum level of effort in maintaining order in the classroom.

All three teachers are college-trained and they teach Form 3. Teachers 010185 and 111175 are ladies, aged 32 and 34, respectively. Both of them teach Bahasa Malaysia and History. Teacher 010185 teaches in a rural school and teacher 111175 teaches in an urban school. Teacher 010185 rates her students' academic ability and motivation to achieve in tests/examinations as 'average,' while teacher 111175 rates them as 'good.'

In contrast, teacher 007045 is male, aged 27. He teaches English and Geography in a rural school. He rates his students' academic ability and motivation to achieve in tests/examinations as only 'fair.'

The differences in the teacher's effort in maintaining order in the classroom measures may result from the differences not only in their perceptions about maintaining order in the classroom but also in their expectations about the students they teach. When teachers expect students to be motivated and able, they expect and so seek more order in the classroom. They expect all the students in the class to focus attention on learning and instruction. When some students talk among themselves or look sleepy, the teachers not only stimulate them [e.g., ask questions about the lesson to sleepy students, and ask anyone who talks to repeat the instruction] to focus their attention on learning and instruction, but also vary their teaching methods and styles of interaction with the students [e.g., rearrange seating to be compatible with the objectives of the lesson, change teaching methods when students look sleepy, and rearrange seating to have equal ability students sit together]. Thus, when the students go on talking among themselves or looking sleepy, the teachers may become frustrated. They may ask students who talk to take up the role of the teacher or ask sleepy students to slap their own faces.

The summary statistics for the 255 measured teachers [Table 3(b)] show that the mean (-0.05) and the standard deviation (1.16) of the 255 teachers' infit values are close to their expected values of zero and one.

The teacher's effort in maintaining order in the classroom measures are well separated (Person separation index, $G = 1.83$, and Reliability index, $R = 0.77$). The separation index indicates that the 255 teachers can be grouped into 3 statistically distinct groups according to the level of their claimed effort in maintaining order in the classroom. To form these groups, we use the mean of the teacher's effort measures (-0.04) and the standard deviation (0.68).

Assessing the Variable

Table 4 shows the measurement distributions of the 255 teachers and 18 items. In column 1 of Table 4 is the distribution of the 255 teachers grouped into 3 distinct groups according to their claimed effort in maintaining order in the classroom. Teachers who claim a "high-level effort" are those measured greater than +0.30 [$M + 0.5S$] logits. Teachers who claim a "moderate-level effort" are those measured between -0.38 and +0.30 logits. Teachers who claim a "low-level effort" are those measured lower than -0.38 [$M - 0.5S$] logits.

In column 3 of Table 4 is the distribution of the 18 items which define the "teacher's effort in maintaining order in the classroom" scale. The scale can be partitioned into 3 parts according to the meanings implied by 3 clusters of the 18 items. The lower cluster consists of 5 items which correspond to teachers who perceive a minimum-level of order in the classroom to be sufficient for effective teaching and learning. These teachers believe that although there may be students who disregard order in the classroom, they can induce these students to focus their attention on learning and instruction by arbitrarily rearranging seating to have class control [Q18(6)], and by stimulating those who talk among themselves or look sleepy [e.g., Q15(2) and Q17(3)].

Q18(6) may also indicate that teachers establish routines and procedures in the classroom to insure that teaching and learning take top priority. In this way, the teachers can spend most of the available classroom time on instruction. However, some of the students may not always obey these routines and procedures. Thus, the teachers have to do more to stimulate these students to work on learning tasks and to focus their attention on learning and instruction.

The middle cluster consists of 7 items which describe teachers who believe that disorders in the classroom are not caused solely by the students' conduct but, to some extent, they are caused by the teacher's teaching methods and styles of interaction with the students. To induce most students to work on learning tasks and to focus their attention on learning and instruction, the teachers believe that they must do more than just rearrange the classroom seating and stimulate those students who talk among themselves or look sleepy. Thus they vary their teaching methods and styles of interaction with the students [e.g., Q18(1), Q17(8) and Q18(2)].

The items may indicate that teachers consider maintaining order in the classroom as a form of instructional challenge which requires similar approach and concern as instructing the subject matters (Anderson, Evertson and Emmer, 1983). They also indicate that the teachers are judging themselves on how well their teaching methods and styles of interaction can induce most students to spend working on learning tasks and to focus their attention on learning and instruction. Thus, these items describe a higher level of teacher's effort in maintaining order in the classroom than those items in the lower cluster.

The upper cluster consists of 6 items which correspond to teachers who believe a maximum-level of order in the classroom to be essential for effective

TABLE 4: THE DISTRIBUTION OF ITEMS AND TEACHERS
(TEACHER'S EFFORT IN MAINTAINING ORDER IN THE CLASSROOM)

1. TEACHERS		2. EXPECTED PERCENT RESPONDING						3. ITEM CALIBRATIONS AT STEP 'M'		4
MEASURE	FREQUENCY	SOMETIMES/FREQUENTLY Q18(6) Q17(3)		SOMETIMES Q15(4) Q18(2)		SELDOM/SOMETIMES Q17(5) Q17(6)		MEASURE	ITEMS DEFINING TEACHER'S EFFORT IN MAINTAINING ORDER IN THE CLASSROOM	Most Probable Responses at Step 'M'
"HIGH LEVEL EFFORT"	79							1.33	Q17(6) : GO OUT OF CL	'Seldom/Sometimes'
								1.27	Q15(5) : SLAP FACES	'Never/Seldom'
								1.12	Q17(7) : CANE/PUNISH	'Seldom'
								0.97	Q17(5) : DO PHYSICAL EX	'Seldom/Sometimes'
								0.97	Q17(4) : STAND ON CHAIRS	'Sometimes'
(M=0.55)=+0.30		80	69	67	61	34	26	0.26	Q17(9) : ASK TO SPEAK	'Sometimes/Frequently'
"MODERATE LEVEL EFFORT"	100							-0.13	Q18(2) : S/W ABILITY	'Sometimes'
								-0.20	Q17(8) : CHG T-METHOD-2	'Sometimes'
								-0.29	Q18(4) : S/W ATTENTION	'Sometimes'
								-0.31	Q18(5) : S/W RESOURCE	'Sometimes'
(M=0.58)=-0.38		66	53	50	44	21	15	-0.40	Q15(4) : CHG T-METHOD-1	'Sometimes'
								-0.41	Q18(1) : S/W OBJECTIVE	'Sometimes'
"LOW LEVEL EFFORT"	76							-0.52	Q17(3) : ASK TO REPEAT	'Sometimes/Frequently'
								-0.56	Q15(3) : WASH FACES	'Sometimes/Frequently'
								-0.62	Q18(7) : S/W METHOD	'Sometimes'
								-0.65	Q17(1) : STOP LESSON	'Sometimes'
								-0.78	Q15(2) : ASK QUESTION	'Sometimes'
								-1.06	Q18(6) : S/W CONTROL	'Sometimes/Frequently'
								[Most Frequently Claimed]		

teaching and learning. These teachers believe that classroom distractions are caused by a few students who are extremely undisciplined. These students' behavior (e.g., continue talking among themselves while the teacher is teaching) may deprive the right of other students to learn. Not only they themselves do not learn but they distract the attention of other students in the class from learning. The students' behavior may indicate their disrespect for others and the teacher. Thus, when a few of the students continue talking among themselves or looking sleepy (even after other preventive and psychological measures like those items in the lower and middle clusters have been taken), the teacher may think that it is his duty to 'teach' them to respect for others, and to instil in them social ideals and moral values.

For example, when a teacher claims Q17(9), he might say to a student, "You always talk to friends while I am giving instruction. I want you to listen to my instruction and learn, but you continue talking. If you think you have understood the lesson, would you please come forward and explain to the class about ..."

The position of these six items along the upper part of the teacher's effort scale indicates that the role of a teacher is not only as an instructor of knowledge and skills but also as a disciplinarian and an inculcator of social ideals and moral values. Thus, these items are hard for most teachers to claim "most frequently." Only teachers who believe that a maximum-level of order in the classroom to be essential for effective teaching and learning would claim these items. Hence, these teachers claim a high-level effort.

Column 2 of Table 4 gives the expected percent of the teachers' responses to each of the six circled items. Since the calibrations of the items are calculated at the average item step (step M), the expected percent will usually be interpreted in terms of "most probable response" at the step M. These responses are presented in column 4.

Among the 18 items, item Q18(6) is the weakest. The most probable response to his item is 'sometimes/frequently.' Teachers located at position $[M + 0.5S]$ are expected to respond 'sometimes/frequently' to items as weak as Q18(6) 80 percent of the time. Item Q17(3) is somewhat stronger. The most probable response to item Q17(3) is also 'sometimes/frequently.' Teachers located at position $[M + 0.5S]$ are expected to respond 'sometimes/frequently' to items like Q17(3) 69 percent of the time. Item Q18(2) is still stronger. The most probable

response to item Q18(2) is 'sometimes.' Teachers located at position $[M + 0.5S]$ are expected to respond 'sometimes' to items like Q18(2) 61 percent of the time. Item Q17(6) is the strongest. The most probable response to this item is 'seldom/sometimes.' Teachers located at position $[M + 0.5S]$ are expected to respond 'seldom/sometimes' to items as strong as Q17(6) 26 percent of the time.

Teachers located at position $[M - 0.5S]$ have lower effort measures than the teachers located at position $[M + 0.5S]$. They are expected to respond less often to any of the 18 items than the teachers located at position $[M + 0.5S]$. In fact, the two teachers located at the top of the teacher's effort scale, 010185 and 111175, are expected to respond 'sometimes/frequently' to items as weak as Q18(6) 97 percent of the time, and to respond 'seldom/sometimes' to items as strong as Q17(6) 74 percent of the time. On the other hand, the teacher located at the bottom of the scale, 007045, is expected to respond 'sometimes/frequently' to items like Q18(6) 36 percent of the time, and to respond 'seldom/sometimes' to items like Q17(6) only 5 percent of the time.

Factor Analysis of the 18 items (Original Responses)

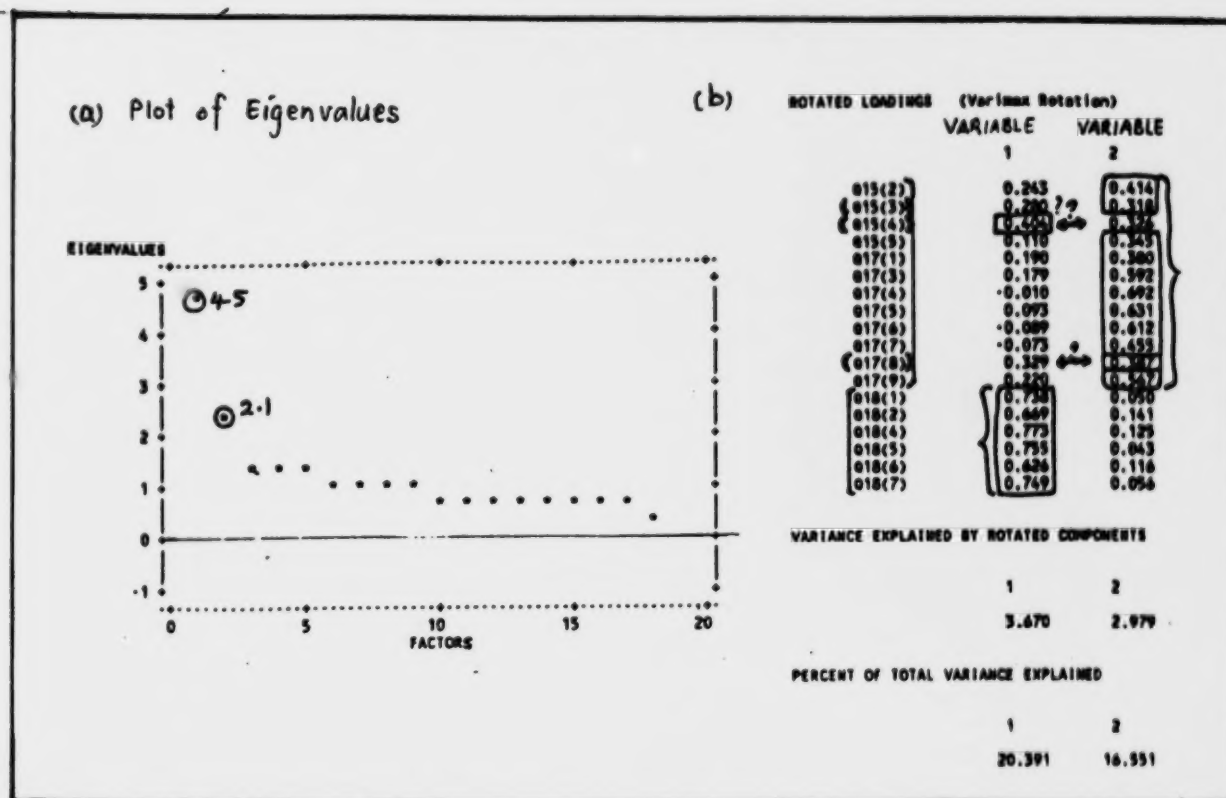
To investigate whether the 18 items are describing more than one dimensions, we factor analyze the original responses. Figure 2 shows the results of the factor analysis and of MSTEPS analysis to each of the two clusters of items identified by the factor loadings.

The plot of eigenvalues [Figure 2(a)] suggests that the 18 items may be clustered into two clusters, and each cluster may represent a single dimension. The varimax rotation of the item factor loadings [Figure 2(b)] shows that Q15(4) and all the 6 items from Question 18 may represent one variable while all items from Question 17 and Question 15 [except Q15(4)] may represent another variable. We analyzed these two clusters of items using MSTEPS. The results are shown in Figure 2(c-d).

(1) Variable 1 [7 Items]

Figure 2(c) shows the item statistics, and summaries of 7 calibrated items and of 252 measured teachers. There is one item, Q15(4), which does not fit the model. Its infit value is +4.2. Although the varimax rotated factor loadings

FIGURE 2: RESULTS OF FACTOR ANALYSIS AND MSTEPS ANALYSIS



(c) VARIABLE 1 (7 ITEMS)									
ITEM STATISTICS -- MEASURE ORDER									
NAME	SCORE	SAMPLE	WEIGHT	MEASURE	ERROR	HWSD	OUTFIT	INFIT	
018(2) S/W Ability	550	250	1.56	.45	.08	1.0	-.3	-.1	
018(4) S/W Attention	576	251	1.27	.24	.10	.7	-2.9	3.1	
015(5) S/W Resource	556	250	1.27	.24	.09	.9	-1.0	1.1	
015(4) Chg T Method 1	592	253	1.10	.10	.10	1.4	4.5	4.2	
018(1) S/W Objection	599	251	1.07	.07	.08	.9	-1.3	-1.1	
018(7) S/W Method	630	249	.80	-.22	.09	.9	-1.6	-1.4	
018(6) S/W Control	747	251	.42	-.88	.09	1.1	.3	1.1	
SUMMARY OF 252 MEASURED PERSONS									
	SCORE	COUNT	MEASURE	ERROR	HWSD	OUTFIT	INFIT		
MEAN	16.9	7.0	.90	-.72	1.0	-.11	-.11		
S.D.	9.1	3	1.30	.28	.7	1.24	1.27		
RMS .77 ADJ.S.D. 1.05 PERSON SEP 1.35 PERSON SEP REL. .65									
SUMMARY OF 7 CALIBRATED ITEM STEPS									
	SCORE	COUNT	MEASURE	ERROR	HWSD	OUTFIT	INFIT		
MEAN	607.1	250.7	.00	.09	1.0	-.53	-.25		
S.D.	67.4	1.3	1.61	.01	.2	2.35	2.34		
RMS .09 ADJ.S.D. 1.61 ITEM SEP 17.99 ITEM SEP REL. 1.00									

(d) VARIABLE 2 (11 ITEMS)									
ITEM STATISTICS -- MEASURE ORDER									
NAME	SCORE	SAMPLE	WEIGHT	MEASURE	ERROR	HWSD	OUTFIT	INFIT	
015(5) Slap Faces	93	255	2.78	1.02	.11	1.1	2.1	5	
017(6) Go Out of Ct	162	254	2.72	1.00	.09	.9	.7	.9	
017(7) Care/Punish	120	254	2.37	.86	.11	1.1	.5	.6	
017(5) Do Physical Ex	168	254	2.06	.72	.08	.9	-1.0	.8	
017(4) Stand on Chair	199	254	2.05	.72	.09	.9	.8	1.1	
017(9) Ask to Speak	474	254	.98	-.02	.07	.9	1.1	1.1	
017(8) Chg T-Method 2	552	254	.60	-.50	.07	1.1	.9	.9	
017(3) Ask to Repeat	632	254	.43	-.84	.07	.8	2.6	2.5	
015(3) Wash Faces	626	255	.41	-.89	.07	1.1	1.7	1.4	
017(1) Stop Lesson	502	255	.38	-.97	.08	1.1	1.5	1.2	
015(2) Ask Question	697	255	.33	-1.11	.07	1.0	.1	-.2	
SUMMARY OF 255 MEASURED PERSONS									
	SCORE	COUNT	MEASURE	ERROR	HWSD	OUTFIT	INFIT		
MEAN	16.3	11.0	-.34	.45	1.0	.02	.04		
S.D.	5.7	.4	.76	.11	.4	.95	1.00		
RMS .46 ADJ.S.D. .60 PERSON SEP 1.52 PERSON SEP REL. .63									
SUMMARY OF 11 CALIBRATED ITEM STEPS									
	SCORE	COUNT	MEASURE	ERROR	HWSD	OUTFIT	INFIT		
MEAN	378.6	254.4	-.15	.08	1.0	-.06	-.16		
S.D.	233.5	.5	1.12	.02	.1	1.44	1.19		
RMS .06 ADJ.S.D. 1.11 ITEM SEP 13.26 ITEM SEP REL. .99									

recommend that this item be clustered with all the items from Question 18, MSTEPS analysis shows that this item does not work together with the other items to define variable 1. In contrast, in MSTEPS analysis of the 18 items (Table 3), Q15(4) fits the model well (infit value = -0.0).

The summary of the 7 calibrated items shows that these items do not work well together to define the variable 1. The mean of the 7 infit values (-0.05) is close to its expected value of zero, but their standard deviation (2.34) is very far from its expected value of 1.

The summary of the 252 measured teachers shows that the mean (-0.11) and the standard deviation (1.27) of the 252 teacher infit values are not as close to their expected values of zero and one as of those shown in Table 4(b). The person separation index ($G = 1.35$) indicates the 252 teachers can be grouped into only 2 statistically distinct groups.

(2) Variable 2 [11 Items]

Figure 2(d) shows the item statistics, and summaries of 11 calibrated items and of 255 measured teachers. The item infit values shows that none of the 11 items do not fit the model.

The summary of the 11 calibrated items shows that these items work well together to define variable 2. However, compared to the mean (0.00) and the standard deviation (1.10) of the 18 infit values (Table 3), the mean (-0.16) and the standard deviation (1.19) of the 11 infit values are slightly inferior.

The summary of the 255 measured teachers shows that the mean (-0.04) and the standard deviation (1.00) of the 255 teacher infit values are close to their expected values of zero and one, but the person separation index ($G = 1.32$) indicates that the 255 teachers can be grouped into only 2 statistically distinct groups.

(3) Comparison of Teacher Measures

Figure 3(a) shows the plot of teacher measures from 7 items (B7) against those from 11 items (B11). Using the procedure suggested by Wright and Masters (1982), we construct a 95 percent confidence interval boundaries around the straight line along which $B7 = B11$.

FIGURE 3: PLOTS OF TEACHER MEASURES

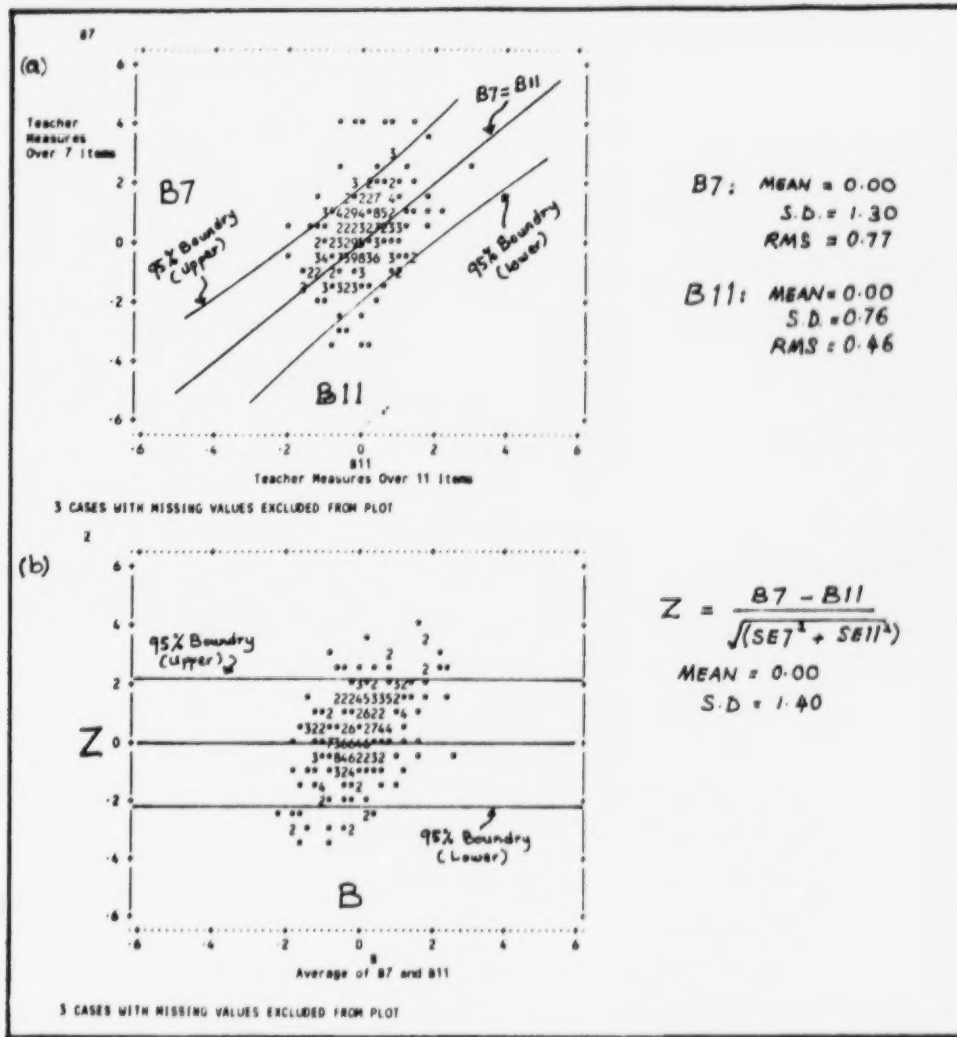


Figure 3(b) shows the plot of the standardized differences of B7 and B11 against the averages of the two measures for the 252 teachers.

These plots show that, at $\alpha = 0.05$, only about 12.7 percent of the 252 teachers measure significantly differently on the two variables.

Figure 2(b) indicates that there are four items [Q15(2), Q15(3), Q15(4), and Q17(8)] with high factor loadings on both factors and they may belong to both clusters. When we perform MSTEPS analysis on these two clusters of 10 and 12

items, we obtain results which are no better than those described above. However, there are fewer teachers (9.3 percent) whose measures are significantly differently on these variables.

Summary and Conclusion

The results of MSTEPS analysis show that the 18 items fit the model. The item and person infit statistics (the means and standard deviations) are close to their expected values of zero and one. The item separation and reliability indices show that the 18 items are well separated in difficulty. The items group together to define the intended "teacher's effort in maintaining order in the classroom" variable. The item calibrations are reasonably ordered in increasing intensity from Q18(6) defining the lowest level of effort behavior to Q17(6) defining the highest level of effort behavior.

The variable can be used to describe three types of teachers in relation to how much effort they claim to maintain order in the classroom. These teachers' behavior coincide with those Anderson, Evertson and Emmer (1980) identified.

The three types of teachers are: First, teachers who believe that a minimum-level of order in the classroom to be sufficient for effective teaching and learning are low effort teachers. They believe that classroom disorders (e.g., distractions and inattention) are the results of students' conduct. They claim "most frequently" to items in the lower cluster, "less frequently" to items in the middle cluster, and "least frequently" to items in the upper cluster. They believe that the established routines and procedures in the classroom [e.g., Q18(6)] can ensure effective teaching and learning.

Second, teachers who believe that a higher level of order in the classroom to be somewhat necessary for effective teaching and learning are higher effort teachers. They believe that disorders in the classroom are not caused solely by the students' conduct but, to some extent, by their own teaching methods and styles of interaction with the students and that the task of maintaining order in the classroom and of controlling students' conduct as an instructional challenge which requires similar approach and concern as instruction in other curriculum areas. They not only adhere to the established routines and procedures in the classroom but also constantly secure an accurate picture of their own teaching methods and styles of interaction with the students.

Third, teachers who believe that a maximum-level of order in the classroom to be essential for effective teaching and learning are highest effort teachers. They believe that classroom disorders are caused by a few students who are extremely undisciplined. They feel that their duty is not only to instruct knowledge and skills but to instil social ideals and moral values in these students. They claim "most frequently" not only to items in the lower and middle clusters but also to items in the upper cluster. This indicates that the teachers are constantly monitoring the class to ensure that the students attend to the academic tasks and continuously engage in the learning. Thus, these teachers claim highest level of effort in maintaining order in the classroom.

Factor analysis may suggest a way by which we might cluster items, however, it is not the surest way. Although factor analysis of the 18 items implies that these items may be formed into two clusters, but when we analyze these clusters of items with MSTEPS and compare their results to those of the 18 items, we conclude that one variable is sufficient and two variables are not necessary.

BIBLIOGRAPHY

- Anderson, L., Evertson, C. and Emer, E. Dimensions in classroom management derived from recent research. Journal of Curriculum Studies, 1980, 12, 343-346.
- Behnke, G. et al. Coping with classroom distractions. In W. Doyle and T.L. Good (Ed.), Focus on Teaching: Readings from The Elementary School Journal, Chicago: University of Chicago, 1982.
- Blau, P.M., and Duncan, O.D. The American Occupational Structure. New York: John Wiley, 1967.
- Boudon, R. Education, Opportunity, and Social Inequality. New York: John Wiley, 1974.
- Brophy, J. Teacher behavior and its effects. Journal of Educational Psychology, 1979, 71, 733-750.
- Brophy, J. E. Classroom organization and management. The Elementary School Journal, 1983, 83, 265-285.
- Brophy, J. and Putnam, J. Classroom management in elementary grades. In d. Duke (Ed.), Classroom Management. The 78th Yearbook of the National Society for the Study of Education, part 2. Chicago: University of Chicago, 1979.
- Emer, E., Evertson, C and Anderson, L. Effective management at the beginning of the school year. The Elementary School Journal, 1980, 80, 219-231.
- Good, T. Teacher effectiveness in the elementary schools: what we know about it now. Journal of Teacher Education, 1979, 30, 52-64.
- Kounin, J.S. Discipline and Group Management in Classrooms. New York: Holt, Rinehart and Winston, 1970.
- Malaysia. The Second Malaysia Plan (1971-1975). Kuala Lumpur, 1971.
- Malaysia. The Third Malaysia Plan (1976-1980). Kuala Lumpur, 1976.
- Malaysia. The Fourth Malaysia Plan (1981-1985). Kuala Lumpur, 1981.
- Malaysia. A Cabinet Committee Report on Implementation of Education Policy Study. Kuala Lumpur: Ministry of Education, 1979.
- Rasch, G. Probabilistic models for some intelligence and attainment tests. Chicago: The University of Chicago Press, 1980.
- Slavin, R. Cooperative learning. Review of Educational Research, 1980, 50, 315-342.

Webb, N. A process-outcome analysis of learning in group and individual settings.
Educational Psychologist, 1980, 15, 69-83.

Wright, B.D. and Masters, G.N. Rating Scale Analysis. Chicago: MESA Press, 1982.